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**(54) CANTILEVER TYPE DISPLACEMENT  
 ELEMENT, CANTILEVER TYPE PROBE USING  
 THE SAME, SCAN TYPE TUNNEL  
 MICROSCOPE USING THE SAME PROBE  
 AND INFORMATION PROCESSOR**

**(57) Abstract:**

**PURPOSE:** To improve productivity, reproducibility of a cantilever type probe by forming a displacement element of one nonconductive element layer and a plurality of heat generator layers, and forming a cantilever type displacement element to be displaced by a thermal drive of the generator layer.

**CONSTITUTION:** A cantilever fixed at one end to an Si substrate 1 is formed of a support 2 made of non-doped polysilicon and heat generator layers 3, 3', 4, 4'. The generator layer is made of doped polysilicon with p-type or n-type conductivity. Further, a probe 5 for sensing a tunnel current and an electrode 6 for outputting its current are formed on the cantilever. Since the support 2 of the cantilever is partly expanded and contracted in an X-axis direction under the control of

currents of the layers 3, 3', 4, 4', it can be driven in X-, Y- and Z-axes. It can be moved in the X-axis direction by supplying the same currents to the entire generator layers. It is moved in the Y-axis direction by supplying the currents only to the layers 3, 4. It can be driven in the Z-axis direction by supplying the currents only to the layers 3, 3'.

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